

Accepted Manuscript

Microstructure, mechanical properties and cutting performance of AlTiN coatings prepared via arc ion plating using the arc splitting technique

Bai-Jun Xiao, Yi Chen, Wei Dai, Kwong-Yu Kwork, Teng-Fei Zhang, Qi-Min Wang, Cheng-Yong Wang, Kwang Ho Kim



PII: S0257-8972(16)31362-7
DOI: doi: [10.1016/j.surfcoat.2016.12.074](https://doi.org/10.1016/j.surfcoat.2016.12.074)
Reference: SCT 21931

To appear in: *Surface & Coatings Technology*

Received date: 10 March 2016
Revised date: 8 December 2016
Accepted date: 20 December 2016

Please cite this article as: Bai-Jun Xiao, Yi Chen, Wei Dai, Kwong-Yu Kwork, Teng-Fei Zhang, Qi-Min Wang, Cheng-Yong Wang, Kwang Ho Kim, Microstructure, mechanical properties and cutting performance of AlTiN coatings prepared via arc ion plating using the arc splitting technique. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Sct(2016), doi: [10.1016/j.surfcoat.2016.12.074](https://doi.org/10.1016/j.surfcoat.2016.12.074)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Microstructure, mechanical properties and cutting performance of AlTiN coatings prepared via arc ion plating using the arc splitting technique

Bai-Jun Xiao ^a, Yi Chen ^a, Wei Dai ^{a,*}, Kwong-Yu Kwork ^b, Teng-Fei Zhang ^c, Qi-Min Wang ^{a,*},

Cheng-Yong Wang ^a, Kwang Ho Kim ^c

^a School of Electromechanical Engineering, Guangdong University of Technology, Guangzhou 510006, China

^b Techmart (Shenzhen) Limited, Shenzhen 518104, P.R. China

^c Global Frontier Center for Hybrid Interface Materials, Pusan National University, Busan 609735, South Korea

* To whom correspondence should be addressed: popdw@126.com; Tel/Fax:+86-13022097190;

qmwang@gdut.edu.cn; Tel/Fax:+86-13802729261.

Abstract: In this work, an arc ion plating (AIP) setup equipped with an arc splitting system was used to prepare AlTiN coatings (s-AlTiN). For comparison, AlTiN coatings were also deposited via conventional AIP (c-AlTiN). The chemical composition, microstructure, hardness and wear properties of the two different coatings were studied by scanning electron microscopy, transmission electron microscopy, energy dispersive X-ray spectroscopy, X-ray diffraction, glow discharge optical emission spectrometry, nanoindentation tests and pin-on-disk tests. The cutting performance of end mill tools coated with the two different AlTiN coatings was investigated by dry milling hardened steel and the wear mechanisms are discussed. The results showed that the s-AlTiN coating exhibited a much smoother coating surface and a denser microstructure instead of the typical columnar structure of the c-AlTiN coating. Furthermore, the s-AlTiN coating exhibited a higher hardness, a lower friction coefficient and a better wear resistance compared with the c-AlTiN coating fabricated through conventional AIP. The application of the s-AlTiN coating was found to significantly improve the tool life.

Keywords: AlTiN coating; Arc splitting; machining; Wear morphology

Download English Version:

<https://daneshyari.com/en/article/5465603>

Download Persian Version:

<https://daneshyari.com/article/5465603>

[Daneshyari.com](https://daneshyari.com)